IN THE CLAIMS

Please amend the claims as follows:

1. (Original) A method comprising:

receiving input optical signals, from an input waveguide on a motherboard, with a photodetector package mounted to a lower surface of a substrate residing above the motherboard;

converting the input optical signals to input electrical signals;

processing the input electrical signals with a first IC chip mounted to the substrate, thereby forming output electrical signals;

converting the output electrical signals to output optical signals via a light-emitting package mounted to the lower surface of the substrate and coupled to an output waveguide to carry the output optical signals; and

providing power to the first IC chip, the light-emitting package, and the photodetector package through the motherboard via capacitor DC shunts (CDCSs) arranged between the motherboard and the substrate.

2. (Original) The method of claim 1, further including generating the input optical signals with a second IC chip mounted to the motherboard and optically coupled to the input waveguide.

3. (Original) The method of claim 2, further including coupling the output optical signals to the output waveguide and receiving the output optical signals with a third IC chip mounted to the motherboard and optically coupled to the output waveguide.

4. (Original) The method of claim 1, wherein the converting of the output electrical signals to output optical signals includes amplifying with transimpedance amplifiers.

5. (Original) The method of claim 1, wherein the converting of the input optical signals to input electrical signals includes amplifying with transimpedance amplifiers.

6. (Previously Presented) The method of claim 1, wherein the converting of the output electrical signals to output optical signals includes emitting light from a vertical cavity surface emitting laser (VCSEL) array.

7. (Previously Presented) The method of claim 1, wherein the converting of the output electrical signals to output optical signals includes emitting light from a light-emitting diode (LED) array.

8. (Previously Presented) The method of claim 1, wherein the converting of the output electrical signals to output optical signals includes emitting light from a laser diode array.

9. (Previously Presented) The method of claim 1, wherein the converting of the output electrical signals to output optical signals includes passing light from the light-emitting package through a microlens array arranged adjacent to the light-emitting package.

10. (Original) A method comprising:

electrically coupling a first IC chip, a light-emitting package, and a photodetector package to respective sets of contact-receiving members of a substrate; and

electrically coupling the substrate to a motherboard with capacitor DC shunts (CDCSs) arranged between the motherboard and the substrate, the CDCSs having a capacitance selected to mitigate noise generated by the first IC chip.

11. (Original) The method of claim 10, further including aligning the light-emitting package and the photodetector package to respective first and second waveguide arrays formed in or on the motherboard.

12. (Original) The method of claim 11, further including:

receiving with the photodetector package input optical signals from the second waveguide array and generating input electrical signals;

processing the input electrical signals with the first IC chip and generating output electrical signals; and

receiving the output electrical signals with the light-emitting package and generating output optical signals and outputting the output optical signals to the first waveguide array.

13. (Currently Amended) An apparatus comprising:

means for receiving input optical signals from an input waveguide on a motherboard[[,]];

means for converting the input optical signals to input electrical signals;

means for processing the input electrical signals thereby forming output electrical signals;

means for converting the output electrical signals to output optical signals;

means for coupling the output optical signals to an output waveguide to carry the output optical signals; and

means for providing power to the means for receiving, the means for processing, and the means for converting the output electrical signals.

14. (Previously Presented) The apparatus of claim 13, further including means for generating the input optical signals.

15. (Previously Presented) The apparatus of claim 14, including means for coupling the output optical signals to the output waveguide and receiving the output optical signals.

16. (Original) An apparatus comprising:

a motherboard;

a substrate having contact-receiving members;

a first IC chip, a light-emitting package, and a photodetector package each electrically coupled to the contact-receiving members; and

capacitive-DC-shunt means for electrically coupling the substrate to the motherboard to mitigate noise generated by the first IC chip.

17. (Original) The apparatus of claim 16, further including means for aligning the light-emitting package and the photodetector package to respective first and second waveguide arrays formed in or on the motherboard.

18. (Original) The apparatus of claim 16, further including:

means for receiving with the photodetector package input optical signals and generating input electrical signals;

means for processing the input electrical signals with the first IC chip and generating output electrical signals; and

means for receiving the output electrical signals with the light-emitting package and generating output optical signals and outputting the output optical signals.

19 (Original) The apparatus of claim 16, wherein the light-emitting package includes an array of light-emitting devices coupled to a first array of transimpedance amplifiers.

20. (Previously Presented) The apparatus of claim 19, wherein the array of light-emitting devices includes one of a vertical cavity surface emitting laser (VCSEL) array, a light-emitting diode (LED) array, or a laser diode array.

21. (Previously Presented) The method of claim 10 wherein:

electrically coupling a first IC chip, a light-emitting package, and a photodetector package further comprises:

providing the substrate with internal power and ground conductors and contact-receiving members for the first IC chip, the light-emitting package, and the photodetector package;

contacting the first IC chip to IC chip contact-receiving members;

contacting the light-emitting package to light-emitting package contact-receiving members;

contacting the photodetector package to photodetector package contact-receiving members; and

forming optional microlens arrays adjacent to the light-emitting package and the photodetector package; and

electrically coupling the substrate to a motherboard further comprises:

providing the motherboard having power wires and leads and ground wires and leads;

forming input and output waveguide arrays in or on the motherboard;

forming optional microlens arrays adjacent to the waveguide arrays;

arranging the CDCSs between the substrate and the motherboard coupled to the power and ground conductors of the substrate and the power and ground leads of the motherboard while aligning waveguide arrays to the light-emitting package and the photodetector package; and

connecting the power wires of the motherboard to a power supply and the ground wires of the motherboard to a ground.

22. (Previously Presented) A method comprising:

receiving input optical signals from an input waveguide with a photodetector package mounted to a substrate;

converting the input optical signals into input electrical signals;

processing the input electrical signals with a first IC chip mounted to the substrate to generate output electrical signals;

converting the output electrical signals into output optical signals with a light-emitting package mounted to the substrate;

coupling the output optical signals to an output waveguide; and

providing power to the first IC chip, the light-emitting package, and the photodetector package from capacitor DC shunts (CDCSs) coupled to the substrate.

23. (Previously Presented) The method of claim 22 wherein:

receiving input optical signals further comprises receiving input optical signals from an input waveguide on a motherboard; and

providing power further comprises providing power to the first IC chip, the light-emitting package, and the photodetector package from the capacitor DC shunts (CDCSs) coupled between the motherboard and the substrate.

24. (Previously Presented) The method of claim 22, further comprising generating the input optical signals with a second IC chip mounted to the motherboard and coupled to the input waveguide.

25. (Previously Presented) The method of claim 22, further comprising receiving the output optical signals with a third IC chip coupled to the output waveguide.

26. (Previously Presented) The method of claim 22 wherein converting the output electrical signals further comprises amplifying with transimpedance amplifiers.

27. (Previously Presented) The method of claim 22 wherein converting the input optical signals further comprises amplifying with transimpedance amplifiers.

28. (Previously Presented) The method of claim 22 wherein converting the output electrical signals into output optical signals further comprises emitting light from a vertical cavity surface emitting laser (VCSEL) array.

29. (Previously Presented) The method of claim 22 wherein converting the output electrical signals into output optical signals further comprises emitting light from a light-emitting diode (LED) array.

30. (Previously Presented) The method of claim 22 wherein converting the output electrical signals into output optical signals further comprises emitting light from a laser diode array.

31. (Previously Presented) The method of claim 22 wherein converting the output electrical signals into output optical signals further comprises passing light from the light-emitting package through a microlens array arranged adjacent to the light-emitting package.

32. (Previously Presented) The method of claim 22, further comprising:

diffracting the output optical signals from the light-emitting package into the output waveguide with a grating; and

diffracting the input optical signals from the input waveguide to the photodetector package with a grating.